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(54) Cold sprayer for surface treatments with binder on road subfloors

(57) The sprayer features a cylinder (1) fitted with a manometer (2), an inlet valve (3), a safety valve (4) an outlet valve (5) and a spraying unit to be rapidly assembled onto the said outlet valve; such a unit consisting of a clutch (6) of a flexible pipe (7) having at its end a nozzle spray unit (8). At first, the cylinder is prepared to be used by filling up chamber (9) with a bitumen and water emulsion, and by determining a difference of air pressure between the outside and the inside for pouring off of said air from an air compressed cylinder and controlling the inlet - to be actuated through the inlet valve (3) - by the manometer (2). After to have linked up the two parts, cylinder (1) and the pipe with nozzle spray unit (8), the cold sprayer can be slung over the operator's shoulder by means of a shoulder-belt (10) to be fixed up at the holding parts (11) and to be used with one hand so determining the pressure outlet of binder through the opening of the outlet valve (5), while the other hand moves the spraying unit with holding on the end part of the flexible pipe (7). The operator so will spread the binder moving himself in behind on the road in order not to hamper a right spraying operation.

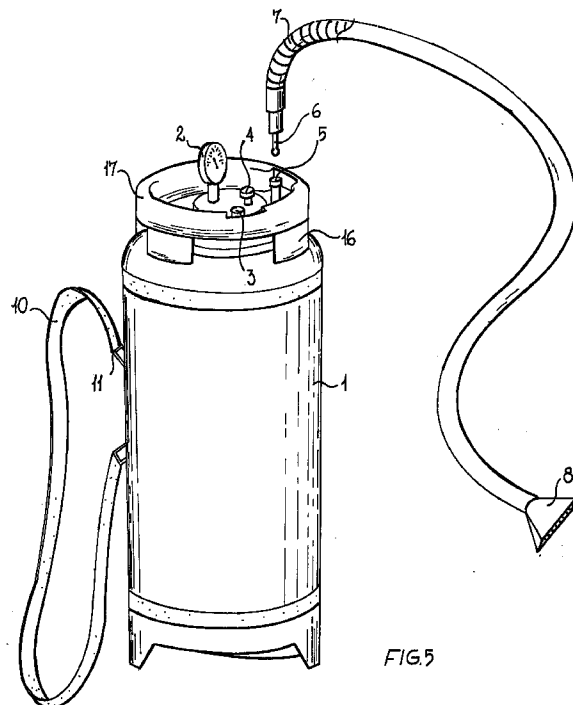


FIG.5

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Description

[0001] The invention refers to a cold sprayer to carry out surface treatments with binder on road subfloors so to ensure the bituminous coating perfect adhesiveness. Said invention principally features a delivering pressure cylinder which discharges an asphalt and water emulsion through a swinging jet that operates by means of a flexible pipe with a nozzle spray unit. The invented sprayer is to be slung over the operator's shoulder or can be trolley-mounted and pulled by the operator himself. According to the prior art devices, now the surface treatments on road subfloors are hot-treated by means of self-propelled machines. Currently tank trucks are usually used to carry the binder from the central station to the yard, while in the zones near refineries tank trucks can apply directly to refineries to refuel hot binder. Self-propelled machines on a continuous cycle are also provided, and namely sprayer-boiler, where bitumen is heated by an oil burner to which the binder is supplied for heating by charging one can at a time through an elevator with a rotating support placed on the tailgate of the loading platform, then hot bitumen is discharged through an air-lift pump into flexible metallic pipes equipped for the hand spraying. In compliance with the new technical trends respectful of the environment and of the townpeople health, hot binders have progressively been replaced by cold ones so that no polluting substances are dispersed in the air and in the surroundings of the working place thus avoiding considerable disadvantages and serious danger for operators. Apart from all considerations about the use of oil boilers, the above cited operative apparatuses have the following basic drawbacks: a) the need to use expensive apparatuses with high maintenance costs; b) the need to carry out working operations following two subsequent standing phases of binder, which must be transported from a central station to the yard and subsequently charged onto the self-propelled spraying machine; c) the need to have two operators in continuity at work; d) empty cans weighing 200 kg. are difficult to be raised from the ground and carried to stocking for disposal. Moreover, all the above stated procedures have too high costs in roadings when only single parts of the bituminous coating must be restored. Before setting forth the purposes of the invention, it should be borne in mind that the present day technology -due to the fact that it requires a separate pumping unit which places the binder taken out from a large size can under pressure, must make use of an operative unit coordinated on a self-propelled means, even if it is clear that such means are obviously disproportionate if compared to the extent of the roadings needed. The invention solves all the above stated problems by providing a cold sprayer in which a certain quantity of binder, contained inside the tank thereof, can be set under pressure by transferring air from an air-compressed cylinder at 3/4 atm. and by letting it spraying out through a nozzle

spray unit which can be operated by a single worker. From a structural point of view, the above stated cold sprayer features a cylinder with a pressure gage, an inlet valve, an outlet valve and a safety control valve, the safety control valve is presettled so that a spraying unit consisting of a flexible pipe with a nozzle dispenser can be quickly set up on it. To organized the yard workings a quantity of delivering pressure cylinders -previously filled up with an emulsion of water and bitumen- must be stocked so to take each time the necessary cylinders for the specific working. Said cylinders to be carried to the working place together with a spraying unit and an air pressure cylinder at 3/4 atm. to set the operating procedures up. The above stated operation can be carried out by transferring the compressed air through a pipe connecting the outlet valve of an air compressed cylinder to the intake valve of one of the cylinders with the binder and by controlling such a transfer by means of a manometer and so on until all the cylinders are filled up. Then, a spraying unit is set up onto the first cylinder to be used thus forming the cold sprayer. The invented sprayer features a cylinder 1 fitted with a manometer 2, an inlet valve 3, a safety valve 4, an outlet valve 5 and a spraying unit to be rapidly assembled onto the said outlet valve; such an unit consisting of a clutch 6 of a flexible pipe 7 having at its end a nozzle spray unit 8. At first, the cylinder is prepared to be used by filling up chamber 9 with a bitumen and water emulsion, and by determining a difference of air pressure between the outside and the inside for pouring off of said air from an air compressed cylinder and controlling the inlet - to be actuated through the inlet valve 3 providing an agibility part 3a- by the manometer 2. Then the cylinder 1 and the pipe with nozzle spray unit 8 are linked up, and the cold sprayer can be slung over the operator's shoulder by means of a shoulder-belt 10 which can be fixed up at the holding parts 11. The sprayer to be used by the operator with one hand so determining the pressure outlet of binder through the opening of the outlet valve 5, providing an agibility part 5a, while with the other hand he moves the spraying unit holding the same on the end part of the flexible pipe 7. The operator so will spread the binder moving himself in behind on the road in order not to hamper a right spraying operation. The forced outlet of the bituminous emulsion from the outlet valve 5 takes place through a suction pipe 12 that is set in a fixed part pipe tract 13, the inlet mouth 14 thereof is featured in a certain space of chamber 9 protected by a filtering net 15 which prevents that the passage duct gets clogged with foreign bodies. The cylinder 1 can be raised and set in a steady suspended position by means of a rest handle 16 with an holding part 17 having a shape cut in the place where the spraying unit must be mounted. To regulate the air pressure in chamber 9 a safety valve 4 is featured, such a valve is operated by means of part 4a thereof. In an embodiment the cylinder body 1 is mounted on trolley 18 with wheels 19 and can be displaced by pulling the handle 17. The present

invention is shown in the accompanying drawings of sheets 1, 2 and 3. In sheet 1, fig. 1 is a longitudinal section view of a cylinder body 1 of the type-knapsack containing a certain quantity of a bituminous emulsion. Fig. 2 is a side view of a trolley-mounted cylinder body 1. Fig. 3 is a top view of the same cylinder body 1. In sheet 2, fig. 4 is an ideographic view of an operator which is working with a cold sprayer slung over his shoulder by means of a shoulder belt 10. Fig. 5 is a perspective view of the cold sprayer set on the ground and namely an expanded view is given of the two components thereof to be linked, i.e. a cylinder body 1 and a pipe with sprayer 8. In sheet 3, fig. 6, the inlet valve 3 is seen both from a longitudinal section view and from a perspective view. Fig. 7 illustrates the outlet valve 5 both from a longitudinal view and from a perspective view. Fig. 8 is a scanned exploded view of the single parts of the safety valve 4. Fig. 9 is a top view of the safety valve 4. Fig. 10 is a sectional view of the safety valve 4. Cold spraying operations can be carried out by an only operator with the sprayer slung over his shoulder by means of a shoulder-belt; if the spraying-unit is trolley-mounted, the operator can displace it with one hand and at the same time he can operate the nozzle spray unit with the other hand while he is in behind on the road. When the binder runs short, the operator will go back to the place where the working units are located; there he will take out the nozzle spray unit from the empty cylinder, which will be placed on the transport means, then the same nozzle spray unit will be mounted on a new cylinder for further utilization, and so on until the road making is completed.

Claims

1. Cold sprayer for surface treatments with binder on road subfloors consists of a cylinder (1) fitted with a manometer (2), an inlet valve (3), a safety valve (4), an outlet valve (5) and a spraying unit to be rapidly assembled onto the said outlet valve; such an unit consisting of a clutch (6) of a flexible pipe (7) having at its end a nozzle spray unit (8); characterized in that:
 - the cylinder (1) is prepared to be used by filling up its chamber (9) with a bitumen and water emulsion and by determining a difference of air pressure between the outside and the inside for pouring off said air from an air compressed cylinder and controlling the inlet
 - to be actuated through the inlet valve (3) providing an agibility part (3a)- by the manometer (2);
 - the cylinder (1) and the pipe with nozzle spray unit (8) are then linked up and the cold sprayer is to be slung over the operator's shoulder by means of a shoulder-belt (10) which can be fixed up at the holding parts (11);
 - said sprayer to be used by the operator with one hand so determining the pressure outlet of binder through the opening of the outlet valve (5), providing an agibility part (5a), while with the other hand he moves the spraying unit holding the same on the end part of the flexible pipe (7); the operator so will spread the binder moving himself in behind on the road in order not to hamper a right spraying operation.
2. Cold sprayer for surface treatments with binder on road subfloors, as per claim 1, characterized in that the forced outlet of the bituminous emulsion from the outlet valve (5) takes place through a suction pipe (12) that is set in a fixed part pipe tract (13), the inlet mouth (14) thereof is featured in a certain space of chamber (9) protected by a filtering net (15) which prevents that the passage duct gets clogged with foreign bodies.
3. Cold sprayer for surface treatments with binder on road subfloors, as per claim 1, characterized in that the cylinder body (1) is to be raised and set in a steady suspended position by means of a rest handle (16) with an holding part (17) having a shape cut in the place where the spraying unit must be mounted.
4. Cold sprayer for surface treatments with binder on road subfloors, as per claim 1, characterized in that to regulate the air pressure in the chamber (9) a safety valve (4) is featured, such a valve to be operated by means of an its part (5a).
5. Cold sprayer for surface treatments with binder on road subfloors, as per claim 1, characterized in that the cylinder body (1) can be mounted on trolley (18) with wheels (19) and can be displaced by pulling its handle (17).

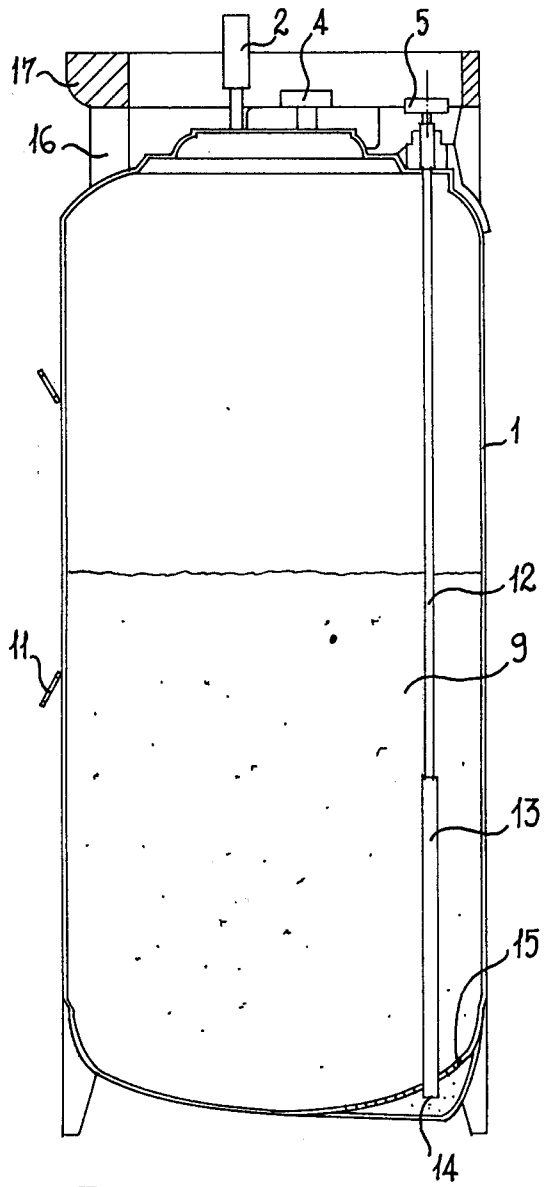


FIG. 1

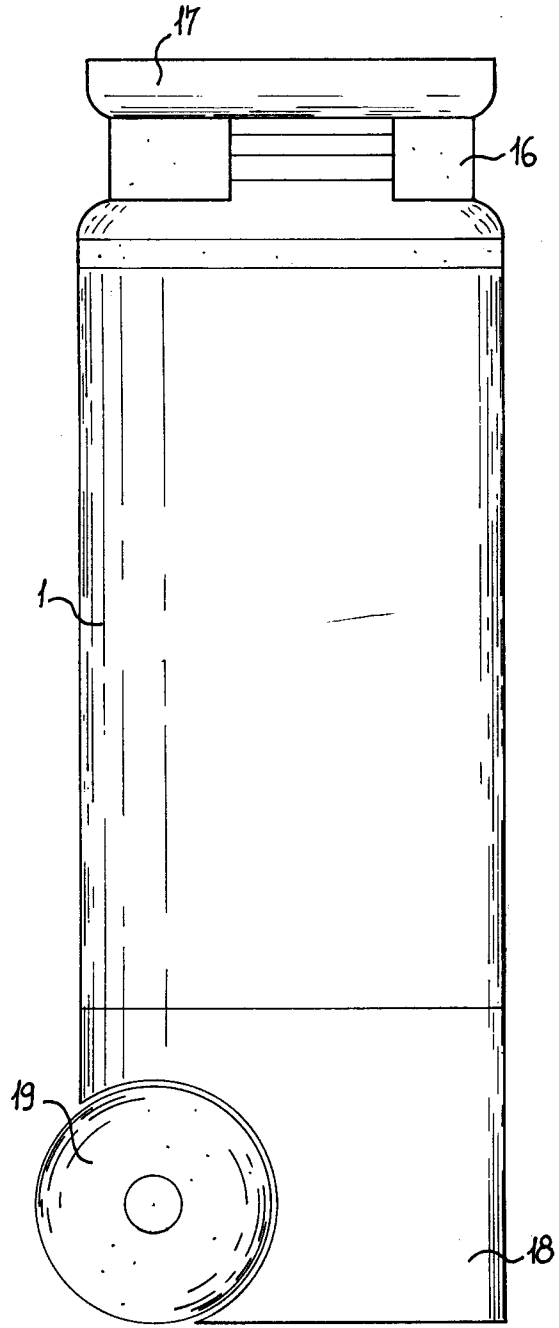


FIG. 2

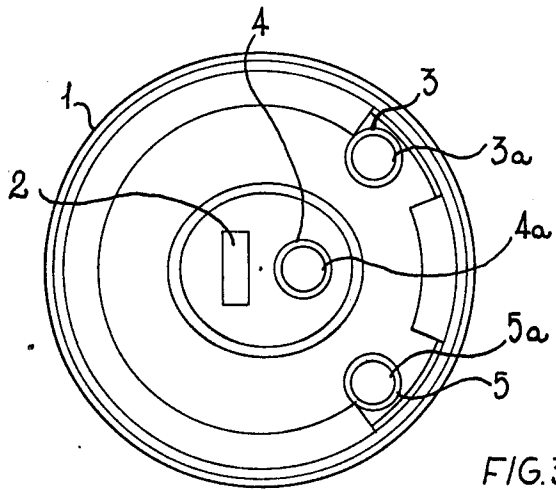


FIG. 3

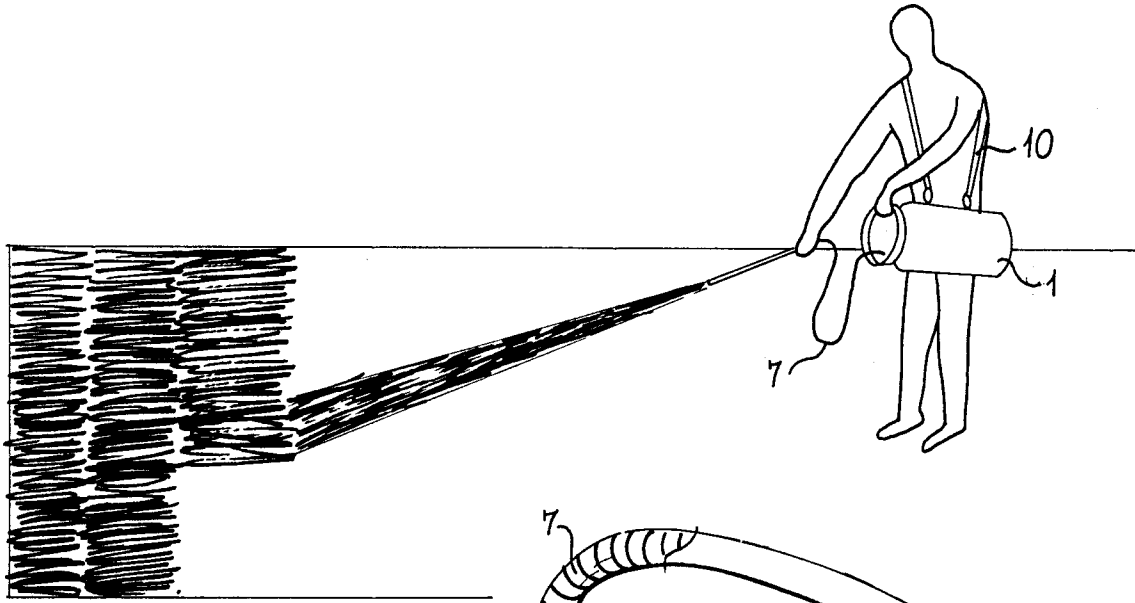


FIG. 4

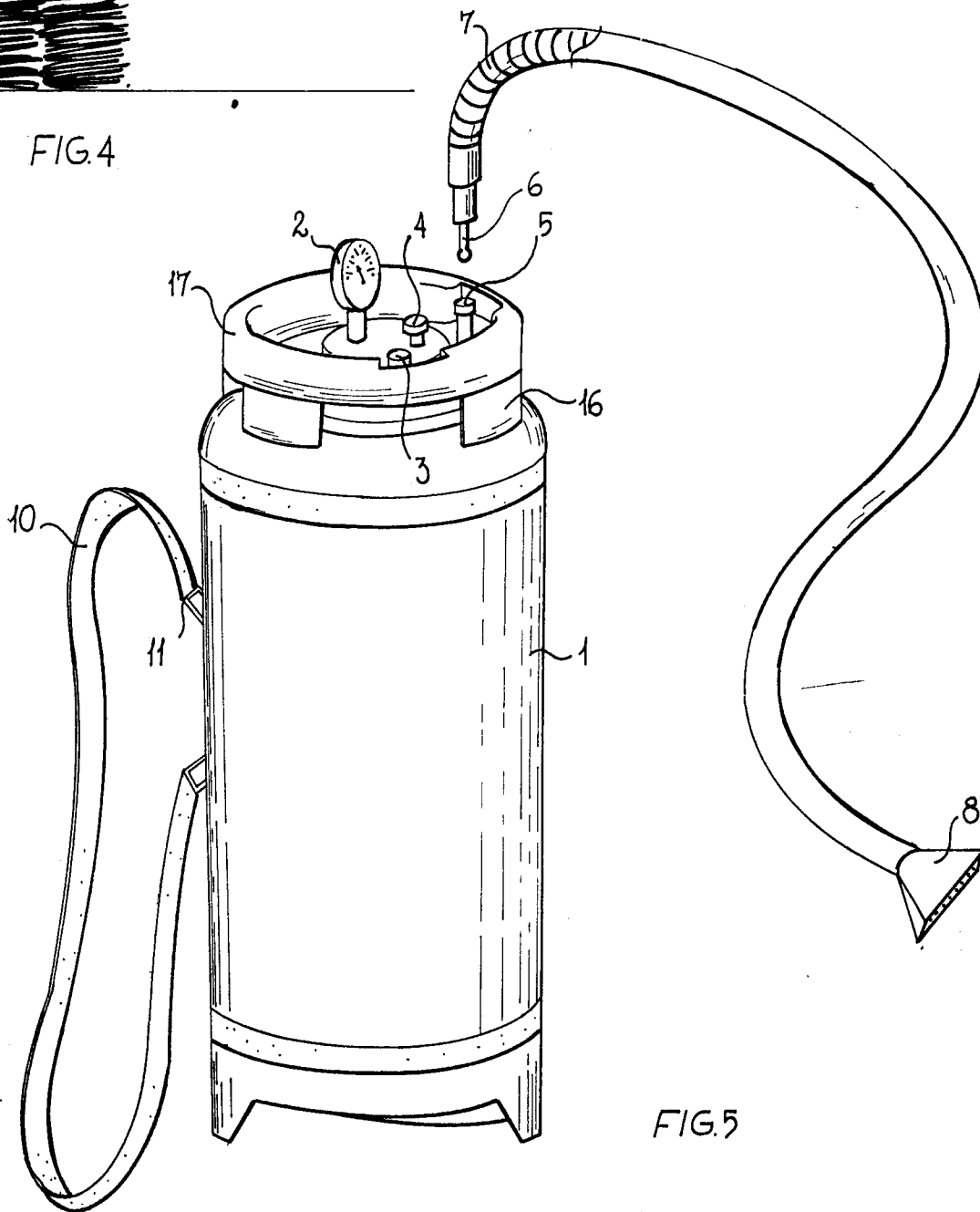


FIG. 5

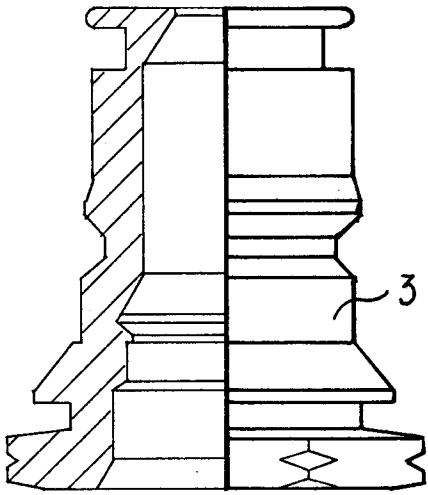


FIG. 6

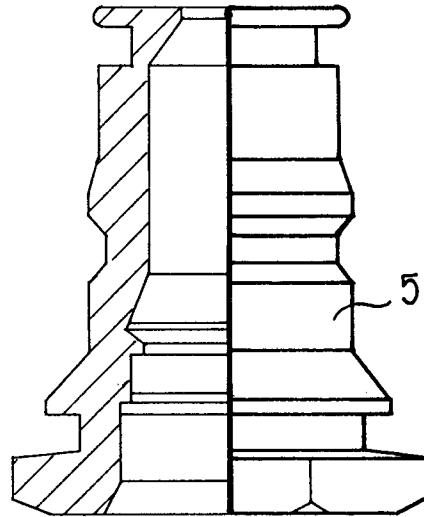


FIG. 7



FIG. 8

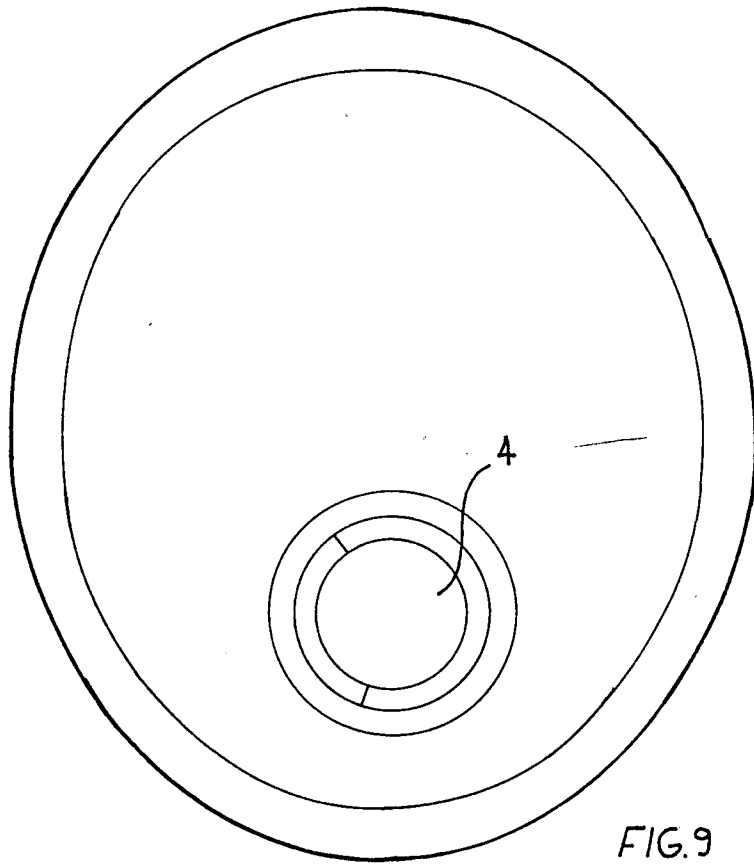


FIG. 9

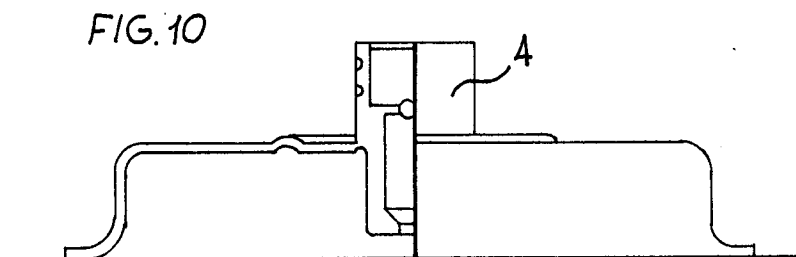


FIG. 10



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EUROPEAN SEARCH REPORT

Application Number
EP 97 12 0584

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB 637 704 A (EXCELARC ENGINEERING COMPANY) 24 May 1950 * page 1, line 10 - line 44 * * page 1, line 57 - line 66 * * page 1, line 83 - line 84 * * page 2, line 119 - page 3, line 14 * * claims 1,4 * * figures *	1	B05B9/08 E01C19/17
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Y	FR 2 487 789 A (SILEC LIAISONS ELEC) 5 February 1982 * page 4, line 10 - line 20 * * page 5, line 15 - line 21 * * figure 1 *	2	
A	---	1	
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		6 November 1998	Andlauer, D
CATEGORY OF CITED DOCUMENTS			
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EUROPEAN SEARCH REPORT

Application Number
EP 97 12 0584

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
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Y	FR 996 301 A (AMBROSI RENIERI) 18 December 1951 * page 1, column 1, line 1 - line 10 * * page 1, column 2, line 13 - line 23 * * page 2, column 1, line 57 - page 2, column 2, line 26 * * page 3, column 1, line 31 - line 37 * * page 3, column 2, line 14 - line 26 * * figures 1,2,8,9,12 *	1
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A	---	
A	FR 1 554 947 A (GABRIELS; EURACOM) 24 January 1969 * figure 11 *	1
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The present search report has been drawn up for all claims		
Place of search	Date of completion of the search	Examiner
THE HAGUE	6 November 1998	Andlauer, D
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